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RARÁMURI NECKLACES: A RAPIDLY CHANGING FOLK-ART FORM IN THE SIERRA MADRE OCCIDENTAL OF NORTHERN MEXICO

KAREN R. ADAMS
Crow Canyon Archaeological Center
23390 County Road K.
Cortez, CO 81321

ENRIQUE SALMÓN
Baca Institute of Ethnobotany
Crestone, CO 81131

ABSTRACT.—Rarámuri women and their families living in the uplands of the Sierra Madre Occidental along the famous Copper Canyon railway make colorful seed bead necklaces. A collection of necklaces purchased in 1994 reveals notable variability. For example, while most appear intended for adornment, some are clearly rosaries, and others have pendants representing religious figures or symbols. The makers have used seeds, various fruit types, stems, wood, and bark of at least 19 different taxa in at least eleven plant families, including fruit or seeds of three domesticates, parts of three taxa naturalized from the Old World, and parts of plants that grow only in the lowlands or deep canyon bottoms. Alterations to raw materials include carving, cutting, filing, and dyeing, as well as soaking prior to piercing. A minimum of five modern materials served as string. Necklace-making appears to be a long-standing Rarámuri tradition, although the diversity of necklaces now available has not been recorded in either historic literature or the limited regional archaeological record. These necklaces, eagerly sought by tourists, represent a rapidly changing folk-art form that helps support their creative Rarámuri makers.

RESUMEN.—Las mujeres y familias que viven en las alturas del Occidental de Sierra Madre junto a la línea de ferrocarril famosa de Barranca de Cobre hacen collares brillantes de semillas. Una collección de collares que habían comprado en 1994 revela variabilidad notable. Por ejemplo, mientras que la mayoría aparece pretentido para decoración, algunos son obviamente rosarios y otros tienen colgantes que representan figuras o símbolos religiosos. Los fabricantes tienen semillas usadas, varios tipos frutales, tallos, madera, y corteza de por lo menos 19 diferentes taxones en por lo menos once familias de plantas, que incluye fruta o semillas de tres domesticates, partes de tres taxones naturalizadas del Mundo Antigua, y partes de las plantas que crecen solo en los planos o fondos de cañones profundos. Alteraciónes primas materias incluyen tallar, cortar, limar, y tenir, tan bien como empapar antes de perforar. Un mínimo de cinco materias se sirvieron como cuerda. La fabricación de collares aparece ser una tradición antigua de los Rarámuri, aunque la diversidad de los collares que están disponsibles no han

estado recordado en literatura histórica ni el registro limitado regional de arqueología. Estos collares que están solicitado de las turistas entusiastas, representan una forma del arte folklórico que está cambiando rapidamente que ayuda a mantener sus fabricantes creativos.

RÉSUMÉ.—Les femmes raramuries et leur famille qui vivent dans les hautes terres de la Sierra Madre occidentale le long du célèbre chemin de fer du Cañon del Cobre font des colliers de grains très colorés. Ces colliers sont très diversifiés comme le révèle une collection acquise en 1994. Par exemple, la plupart des colliers de cette collection sont en apparence exclusivement ornementaux, mais certains sont définitivement des rosaires et d'autres comportent des pendentifs à motif, figure ou symbole, religieux. Les artisans ont utilisé comme matière première des graines, diverses sortes de fruits, des tiges, du bois et de l'écorce d'au moins dix-neuf taxons différents appartenant à au moins onze familles botaniques et comprenant des fruits ou des graines de trois plantes naturalisées, des parties de trois plantes introduites de l'ancien monde et des parties de plantes qu'on trouve seulement dans les basses terres ou au fond des canyons profonds. Ces matériaux ont été soit sculptés, coupés, limés, teints ou même trempés avant d'être percés. Au moins cinq matériaux modernes ont été utilisés comme fil. La fabrication de colliers est une tradition ancienne chez les Raramuris, mais la diversité des colliers disponibles aujourd'hui n'a jamais été consignée dans la documentation historique ou les petits dépôts d'archives archéologiques locales. Ces colliers, très recherchés par les touristes, représentent une forme d'art populaire qui évolue très rapidement et qui aide financièrement ses créateurs raramuris.

INTRODUCTION

Colorful seed bead necklaces made by Rarámuri (Tarahumara) women and their families in the Barranca del Cobre area of the Sierra Madre Occidental of northwestern Mexico are sold mainly to tourists traveling the famous Copper Canyon railway. A number of these necklaces were purchased by the authors during two visits to the Sierra Madre uplands in the fall of 1994. The collections were made in the state of Chihuahua on both sides of the continental divide at Divisidero (2320 m) and at Creel (2375 m), in Wapakajipare rancheria some 600 meters below Divisidero, and at the village of Cerocahui (1600 m) (Figure 1).

The largest selection of necklaces was found at the train stop at Divisidero where vendors draped their necklaces over the lips of woven baskets woven of sotol *(Dasylirion)* or beargrass *(Nolina)* leaves, or pine *(Pinus)* needles, so as to be easily seen. Some women laid their necklaces in piles next to their other wares. The second largest selection of necklaces was found in Creel, to which vendors had traveled to sell their folk-art in the streets and restaurants. Here numerous craft shops offered an ample selection. Each necklace cost the equivalent of U.S. $1.50 to $3.00. Thus the project rapidly grew from casual purchasing to a systematic effort to acquire a representative collection. We feel the necklaces gathered adequately represent the diversity of materials used and styles available in 1994. The majority of the necklaces have been deposited at the Baca Institute of Ethnobotany, Crestone, CO.

FIGURE 1.—Area of this study, along the Copper Canyon Railway.

METHODS

Interviews with Rarámuri women in their native language provided their perspectives on various aspects of necklace making, including the terms they used for the parts. We were able to identify most of the materials used in necklace construction by comparing them to specimens curated in the University of Arizona Herbarium (ARIZ), where many scholars continue to document northern Sierra Madre flora. We also researched historic and prehistoric perspectives on the necklaces to assess how this art form is changing. Learning the identities of each raw material revealed which plants people gathered locally and which required longer trips or trading. Strings were directly compared to a wide collection of raw materials including agave, wool, milled cotton, nylon and polyester threads, fishing line, and copper wire. Burning tests often helped in string identification. This study was greatly facilitated by Salmón's ongoing research on Rarámuri ethnobotany (1995, in press).

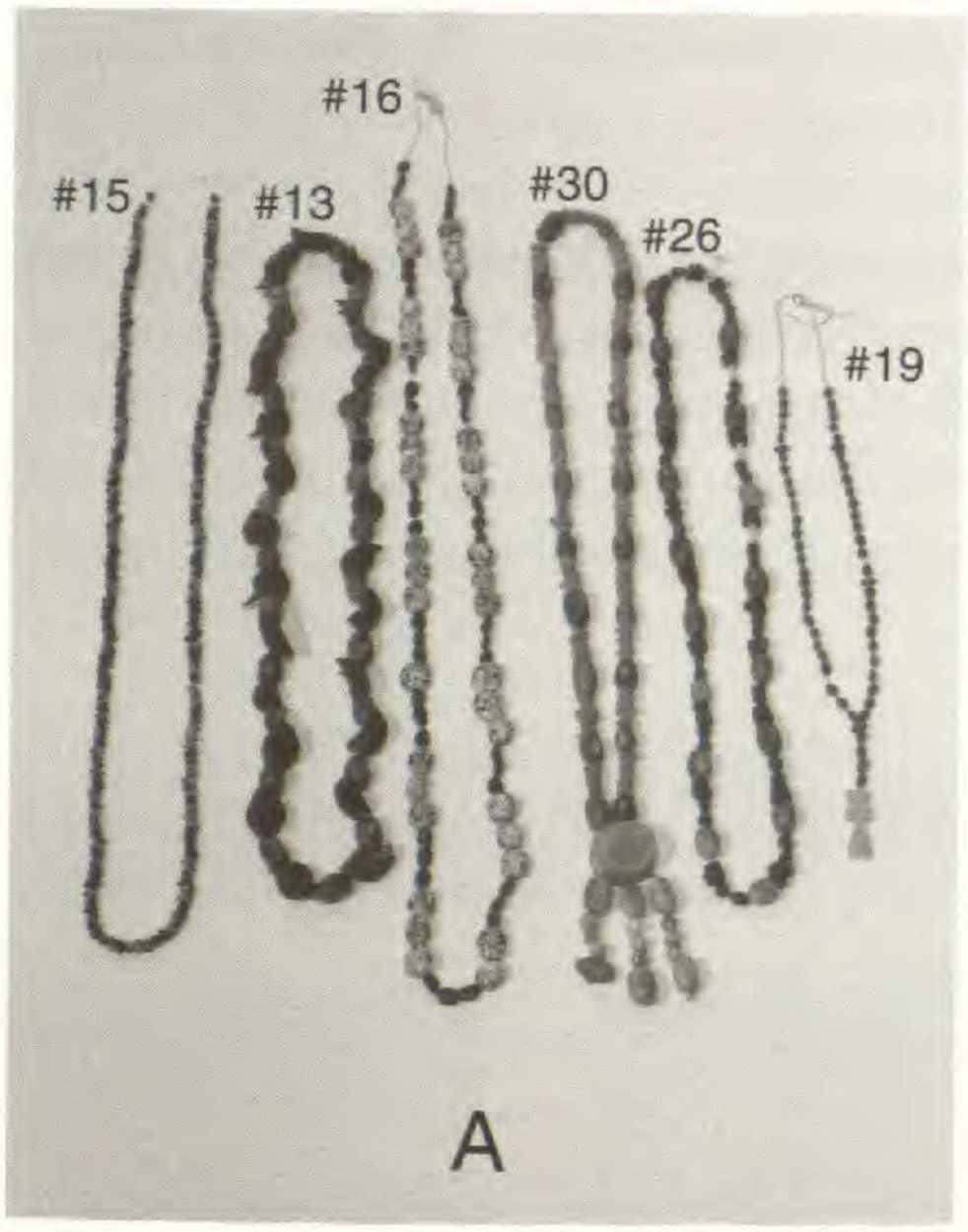
RESULTS

The materials of necklace construction are quite varied at present (Figure 2A). They include seeds, fruits such as caryopses and achenes, stems, wood, and bark of at least 19 different taxa in at least 11 plant families (Table 1). The pendants can be simple or elaborate carved crosses (Figure 2B), drums (Figure 2C), or represent a religious symbol, such as the Virgin of Guadalupe surrounded by beadwork (Figure 2D).

TABLE 1.—Taxa and parts identified for 29 Rarámuri necklaces purchased in the fall of 1994, organized alphabetically by plant family

Family	Scientific Name	Common Name(s)	Part	Notes
Asteraceae	*Helianthus annuus*	sunflower	achene	domesticated
Bombacaceae	*Ceiba acuminata*	***kapok***	seed	
Cupressaceae	*Juniperus/Cupressus*	juniper/cypress	wood	
Ericaceae	*Arbutus glandulosa*	madrone, *madroño*	fruit	immature and mature
	A. arizonica		fruit	
Euphorbiaceae	*Ricinis communis*	castor bean	seed	introduced
Fabaceae	*Acacia farnesiana*	acacia	seed	
	Albizzia sinaloensis		seed	flat
	Erythrina flabelliformis	coral bean	seed	
	Pisum sativum	pea	seed	domesticated; introduced
	Pithecellobium dulce	***guamúchili***	seed	
	Rhynchosia precatoria	rosary bean	seed	
Fagaceae	*Quercus* spp.	oak	acorn (no cap)	
Liliaceae	*Yucca* sp.	yucca	seed	
Pinaceae	*Pinus leiophylla* type**	pine	bark	
	Pinus type	pine	wood	
Poaceae	*Coix lacryma-jobi*	Job's tears, ***batagá***	caryopsis	cultivar; introduced
	Otatea type**	bamboo	stem	see below
	Zea mays	maize, corn	caryopsis	domesticated
Martyniaceae	*Martynia annuua*	devil's claw	fruit	
Unknown	Unknown dicotyledon	wood	*Ptelea trifoliata?*	

*See Appendix 1 for a more complete listing of common names.
**Use of the word "type" conveys that the necklace material resembles the taxon named, but that the identification is not secure. For example, the grass stems, identified as Otatea type, match bamboo in hardness, but need to be compared anatomically to other robust-stemmed grasses for a more secure identification.



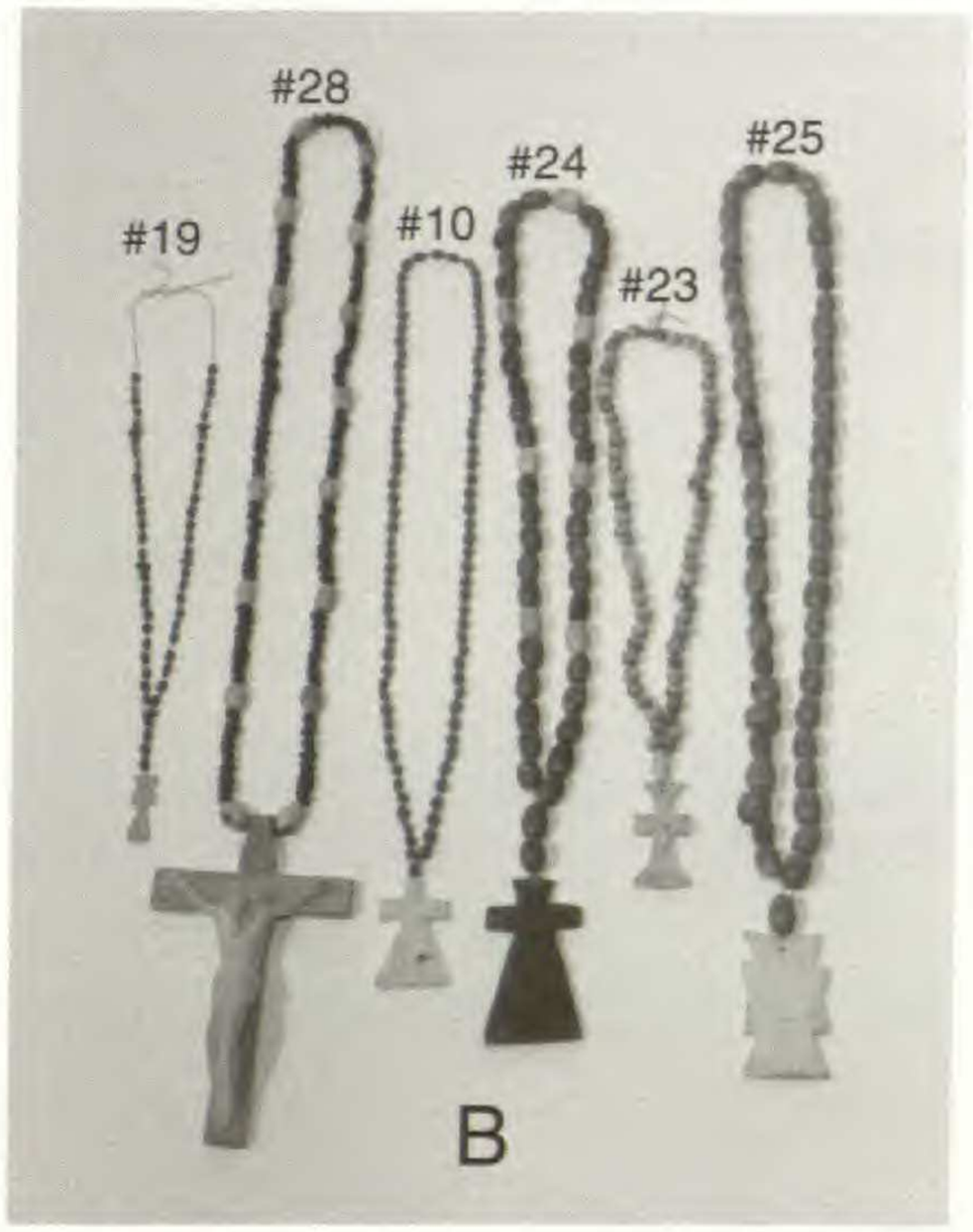


FIGURE 2.—Rarámuri necklaces, illustrating the variety of plant parts utilized. (A) Varied necklace materials, from left to right: necklace #15 of *Rhynchosia;* #13 of *Erythrina* and *Martynia;* #16 of *Ricinis* and *Pithecellobium;* #30 necklace with drum of *Erythrina* and *Albizzia;* #26 of *Ceiba, Erythrina,* and *Yucca;* and #19, a rosary composed of *Acacia.* (B) Necklaces with diverse crosses and symbols, from left to right: #19 with Rarámuri cross; #28 with crucifix and carved Jesus figure; #10 with Rarámuri cross; #24 with Rarámuri cross of carved *Pinus* bark; #23 with Rarámuri cross; and #25 with Tarahumara four-directions symbol. (C) Necklaces with drums. (D) Necklaces with Virgin of Guadalupe, #21 of carved *Pinus* bark (left) and #8 of carved *Pinus* bark surrounded by beadwork (right).

Both domesticated and wild plants are utilized in necklace-making. Domesticates include New World maize (*Zea mays* L.) kernels and sunflower (*Helianthus annuus* L.) achenes and Old World garden peas (*Pisum sativum* L.) (Figure 3A). Among non-domesticates the legume (Fabaceae), ***kapok*** (Bombacaceae), spurge (Euphorbiaceae), and grass (Poaceae) families are well represented. One often sees New World coral beans (*Erythrina flabelliformis* Kearney) and ***kapok*** seeds (*Ceiba acuminata* [S. Wats.] Rose) and Old World castor beans (*Ricinis communis* L.) and pearly white or grey Job's tears (*Coix lacryma-jobi* L.) in combination with other materials (Figure 3B), or alone (Figure 3C).

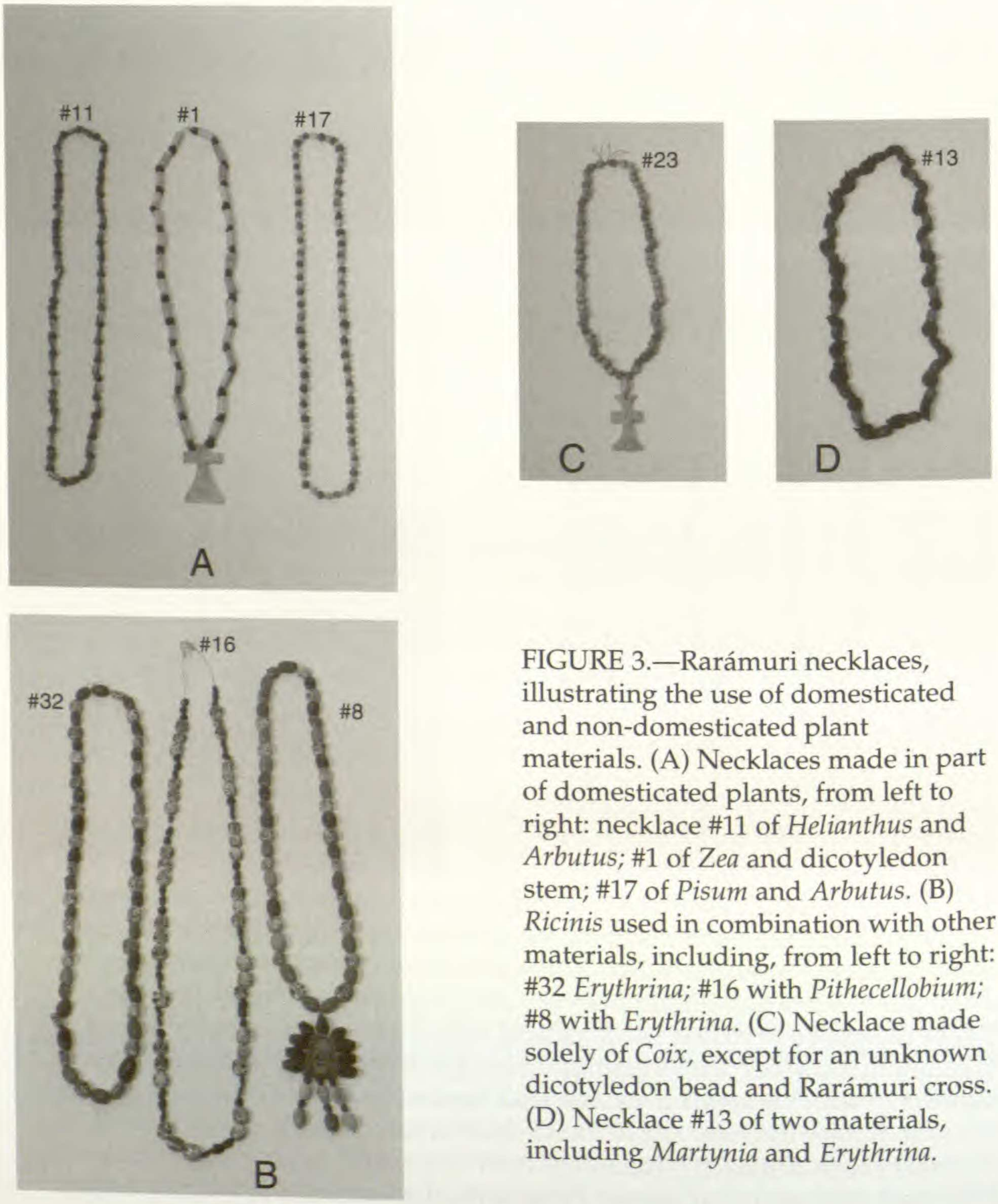


FIGURE 3.—Rarámuri necklaces, illustrating the use of domesticated and non-domesticated plant materials. (A) Necklaces made in part of domesticated plants, from left to right: necklace #11 of *Helianthus* and *Arbutus;* #1 of *Zea* and dicotyledon stem; #17 of *Pisum* and *Arbutus.* (B) *Ricinis* used in combination with other materials, including, from left to right: #32 *Erythrina;* #16 with *Pithecellobium;* #8 with *Erythrina.* (C) Necklace made solely of *Coix,* except for an unknown dicotyledon bead and Rarámuri cross. (D) Necklace #13 of two materials, including *Martynia* and *Erythrina.*

The necklaces or their pendants are strung on a minimum of five modern materials. These include: (a) milled cotton thread; (b) milled synthetic (polyester or nylon) thread, some of which may be cotton-wrapped; (c) nylon fishing line; (d) the flat yellow plastic strips that make up loosely-woven bags in which grapefruit are sold; (e) and copper wire. Notably, no pita *(Agave)* fibers were identified as string. Detailed information on each taxon used can be found in Appendix 1, and necklaces are described in detail in Appendix 2.

DISCUSSION

About necklace-making.—Rarámuri generally soak the beans, seeds, or fruit until they are soft enough to be pierced by a modern stainless steel sewing needle. Madrone fruit are strung while still fresh and soft, and then allowed to dry and shrink down tight against the thread. The Job's tears are said to have a hollow center, permitting easier piercing. Pine bark is easy to carve, and one can see rectangular scars on many living pine trees where bark has been removed for making pendants and other carvings.

Some alterations are made to the natural form of bead types. The necklaces with devil's claw fruit have usually had the short, naturally sharp ends of the claws filed smooth to reduce risk of puncture. On occasion carved wooden beads have been dyed, and acorns are sometimes blackened by cooking them in burned lard. The use of immature green and mature red madrone fruit in different necklaces suggests that people gather resources as they become seasonally available.

The necklace-makers express their artistry in many ways. Although they will make a necklace with only one bead type (Figure 3C), they more commonly use two (Figure 3D). Sometimes differences in the ratios of bead types chosen produce very different patterns, for example, two necklaces made with a 1:1 or 7:1 ratio of Job's tears to coral beans. The color combinations are often striking, such as white garden peas alternating with bright red madrone fruit. Many of the current combinations have been created because their makers say "they are pretty."

Necklaces can display great attention to detail and pendant elaboration. One particularly fine pendant has a carved pine bark visage of the Virgin of Guadalupe surrounded by a series of angular, carved and dyed wooden beads, plus other dangling beads, all held tightly together by copper wire (Figure 2D). This same necklace was the only one on which the artist purposefully singed the thread ends to reduce raveling.

Source of raw materials.—It is of interest to know where the raw materials grow naturally. The necklaces reported here were all purchased in the Copper Canyon uplands above 1600 m, and the majority of the items can be easily acquired in the middle and upper reaches of the barrancas. However, a number are more tropical in nature, and tend to grow in the lower depths of the deep canyons, such as Job's tears *(Coix lacryma-jobi),* devil's claws (*Martynia annuua* L.), and rosary bean plants (*Rhynchosia precatoria* [L.] D C.). Others available only part-way up the barrancas include coralbean *(Erythrina flabelliformis), **kapok** (Ceiba acuminata),* and bamboo (*Otatea* sp.). It is clear the necklace makers must either travel or trade to acquire some of their raw materials. The strings reported here are all available commercially.

History of necklace-making.—The Rarámuri claim that necklace-making is traditional. This is borne out by limited Northern Mexico archaeological and ethnographic records. It is important to note, however, that there may well be regional variation in necklace-making, as the archaeological and ethnographic records reported here are not from the current study area, which is centered at Divisidero.

The sparse archaeological record of the northern Sierra Madre in deposits considered Basketmaker — in the U.S. a period spanning some number of centuries B.C. until A.D. 700 — reports seeds of *Erythrina* recovered from one excavated burial site as funeral offerings (Zingg 1940:17). "Seeds" (or rather the fruit?) of a species of madrone (*Arbutus xalapensis* HBK.) recovered from this same site (Zingg 1940:10, 51-52) were interpreted as a food offering, or for making necklaces.

Colonial written records describing Rarámuri life and culture date back to 17th century Jesuit accounts (Perez de Ribas 1645; Neumann 1938; Arlegui 1737; Pfefferkorn 1794; Steffel 1809). However, the first observations by non-Rarámuri of seed and bead necklaces were by Carl Lumholtz in the late 19th century (1902). Lumholtz reported that these very shy people were not very fond of wearing ornaments, and that "they do not like to look at themselves" (1902:151). But he also noted that many of the women and men wore "strings of glass beads... and necklaces made from the seed of *Coix lacryma-jobi*, mainly for medicinal purposes" (1902:151). He observed that the men chose to wear only a single string of the seeds while the women would wear several. The shamans, he noted, wore the seed necklaces at all official functions (1902:151).

After Lumholtz, the next ethnographic reports to mention Rarámuri adornments were those of Wendell Bennett and Robert Zingg (1935) and Zingg (1940). They noted only the seeds of *Coix* being used as necklace and rosary adornment. Thirty years later Pennington reported on necklace materials in use in 1963, although it is clear he drew some of his information from the earlier cited publications. According to Pennington, five plants supplied wood, seeds, or grass grains in preparing beads which were strung upon pita (*Agave* spp.) fiber or upon woolen thread (1963:44, 213-214):

> (a) *Coix lacryma-jobi*, or Job's tears, a grass cultivated in garden plots, and identified only from post-Spanish sites. First noted by Lumholtz in 1902.
>
> (b) *Ptelea trifoliata*, the hop tree, which supplied an easily worked wood fashioned into crosses or beads. The necklaces described in this paper contain an unknown dicotyledon wood that may turn out to be *Ptelea*.
>
> (c) "Handsome red beans (*Erythrina flabelliformis*?)", recorded by Steffel (1809) in preparing a necklace; "seeds of a species of *Erythrina* have been recovered from local Basketmaker sites" (Zingg 1940), and were apparently funeral offerings.
>
> (d) Two species of madrone, *Arbutus glandulosa* and *A. arizonica*, also recovered from Basketmaker sites (Zingg 1940).
>
> (e) ***Saaburi,*** an unidentified plant which supplied black seeds for beads, and which we now think may be seeds of *Pithecellobium dulce* (Roxb.) Benth.

The most recent study of Rarámuri plants includes mention of only madrone fruits used for necklaces (Bye 1976).

Since the studies by Pennington (1963) and Bye (1976), there has been an obvious increase in the variety of materials gathered by the Rarámuri for making necklaces, and a general elaboration of this folk-art form. We report the use of at least 19 separate taxa for beads and pendants and at least five separate materials for string, none of them either *Agave* or wool. It seems that Rarámuri necklace-making is a folk-art form changing rapidly to suit new economic opportunities, and reflecting greater access to non-local items such as Old World domesticates, polyester thread, copper wire, plastic grapefruit bags, etc.

The present diversity in necklace materials and styles is likely a response to increased contact with tourists. The completion of the Copper Canyon railway in 1961 opened this portion of the Sierra Madre to larger numbers of visitors (Kennedy 1990). The development of tourism has been made possible not only by the presence of the railway, but also by paving the road from San Juanito to Creel (1982) and by the near completion of the paved road from Creel to Guachochi. Steadily increasing hotel availability since the late 1960s has played a major role in the current boom in tourist visitation.

Significance of necklaces for the Rarámuri.—Although non-vending Rarámuri prefer to wear glass beads, the significance of these necklaces seems to be both religious and medicinal. For example, some necklace creations reflect a 300+ year history of Christian influence in the region, especially those that include carved wooden crucifixes and the Rarámuri Cross (Figure 2B). The Rarámuri Cross is similar to the Christian crucifix, but differs in that the bottom fans out. Some necklaces are clearly rosaries, though they may not be used as Catholics usually use them, but instead are worn at traditional ceremonies and church services.

Carved pine bark visages can represent important religious figures in Rarámuri lives (Figure 2D). For example, the Virgin of Guadalupe is a much-venerated figure whose feast day December 12 is quite important within the religious year. On this day and others during the winter months Rarámuri Matachine dancers, considered soldiers of the Virgin, perform in her honor.

Other necklaces have round Father Sun figures also carved of pine bark. The sun is called ***Reyénari*** in the Rarámuri language. Rarámuri refer to both the sun and the creator as *Dios en el Cielo* (God in Heaven), *El Señor,* and *El Papá* (The Father), and consider the sun a representation of ***Onorúame*** (Salmón 1991).

The necklaces have also served "medicinal purposes," and were part of shaman paraphernalia worn during official functions (Lumholtz 1902:151). In the Basihuare area necklaces of *Erythrina flabelliformis* were considered protection for children from beings associated with water (Merrill 1988:138), while Job's tears necklaces were important to curers (Lumholtz 1902:151). It is interesting that some of the seeds/fruit used in necklace-making are currently medicinal cures. For example, castor beans are made into a paste for gastrointestinal ailments and external application to damaged tissues, coral beans and acacia seeds provide an eye wash, acorn juice treats weak heart problems, and Job's tears are eaten as a preventative (Salmón, in press).

SUMMARY

A 1994 collection of seed bead necklaces purchased from Rarámuri women and their families in the uplands of the Sierra Madre Occidental are quite varied. The makers use seeds, fruit, stems, wood, and bark of 19 different taxa in 11 plant families, including fruit or seeds of domesticates, parts of naturalized plants, and materials that are only available in the lowlands or deep canyon bottoms. Strings are of modern materials such as nylon fishing line and polyester and cotton thread. Some necklaces are clearly rosaries, and others have pendants that represent religious figures such as the Virgin of Guadalupe, or symbols such as the Rarámuri cross. To prepare the materials for stringing, the artists sometimes carve, cut, file, dye, or soak them prior to piercing. These inexpensive necklaces, eagerly sought by tourists, are rarely worn publicly by Rarámuri, who instead prefer to wear glass beads. Yet the necklaces have both religious and medicinal significance to their makers. Rarámuri necklace-making in some form may have a long history, but as a current folk-art form is quite elaborate in comparison to the limited northern Mexican archaeological record and written literature of the colonial period. Tourist visitation to Copper Canyon over the past three decades has provided ever increasing demand for these elegant necklaces, crafted by their makers for beauty, health, and prayer.

ACKNOWLEDGEMENTS

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Appendix 1.—Materials of Rarámuri necklace construction, organized alphabetically by taxon. Unless otherwise indicated, ethnobotanical data, including native terms which are in bold italics, are derived from Bye (1985) and from recent field work in Norogachi, Divisidero, Cerocahui, and Creel (Salmón 1995, in press). (Rm) = Rarámuri term; (Sp) = Spanish term

SCIENTIFIC NAME: *Acacia farnesiana* (L.) Willd.
Common name(s): ***chapote*** (Rm), ***wichaká*** (Rm), ***mokowí*** (Rm)
Part: seed
Color: brown
Additional ethnobotanical information: Flowers used in a wash for eye problems, headaches, bruises. Spines made into a tea and drunk for kidney ailments
Alterations: none
Where grows today: Native taxon. Often a small tree. Does well in grasslands, openings in the thorn forest, or in dry deciduous forest, 300-2000 m (McVaugh 1987).

SCIENTIFIC NAME: *Albizzia sinaloensis* Britton & Rose
Common name(s): ***cayábajo*** (Rm)
Part: seeds
Color: some are tan; others are green
Alterations: none
Notes: the tan flattened, but somewhat irregular seed is dicotyledonous, confirmed by two cotyledons emerging from a seed that began germination. The green seed is somewhat similar, but the two may not be identical.

SCIENTIFIC NAME: *Arbutus glandulosa; A. arizonica* (A. Gray) Sarg.
Common name(s): madrone, *madroño* (Sp), ***urúbisi*** (Rm)
Part: fruit, immature and mature
Color: green (immature); red (mature)
Additional ethnobotanical information: knots used for kick balls, berries edible.
Alterations: none
Where grows today: Native, common shrubs of the uplands.

SCIENTIFIC NAME: *Ceiba acuminata* (S. Wats.) Rose
Common name(s): ***chikókawi*** (Rm), ***sikókawi*** (Rm)
Part: seed
Color: brown
Additional ethnobotanical information: The cotton-like seed hairs furnish the buoyant ***"kapok"*** of commerce.
Alterations: none
Where grows today: Large trees, grows in lowlands, up to 900 m in elevation.

SCIENTIFIC NAME: *Coix lacryma-jobi* L.
Common name(s): Job's tears, ***batagá*** (Rm)
Part: caryopsis
Color: pearly white to gray
Additional ethnobotanical information: Necklaces made from the seeds of *Coix lacryma-jobi* worn by both men and women "chiefly for medicinal purposes" (Lumholtz 1902, I:151). This tall, broad-leaved grass is cultivated in garden plots. None found in pre-Spanish archaeological sites (Pennington 1963:213-214). The "seeds" may be ground to flour and made into a coarse but nourishing bread (Sturtevant in Hedrick 1972:184).
Alterations: none
Where grows today. Introduced from tropical Asia. Cultivated in the western barrancas.

SCIENTIFIC NAME: *Erythrina flabelliformis* Kearney
Common name(s): coral bean, *chilicote* (Sp), *colorín* (Sp), ***aposhi*** (Rm)
Part: seed
Color: varied, tan to red to orange
Note: Comparisons to another large Fabaceae seed type, *Sophora secundiflora*, were less satisfactory. *Sophora* seeds are smaller and lack a raised area along their dorsal side. They also bear an indented seed scar (Merrill 1977)
Additional ethnobotanical information: seed crushed and made into a tea for gastrointestinal problems, headaches, toothaches, eye problems
Alterations: none
Where grows today: a native plant, sensitive to frost. In Arizona it grows up to 1670 m (Kearney and Peebles 1960:480).

SCIENTIFIC NAME: *Helianthus annuus* L.
Common name(s): sunflower, ***sewáchari*** (Rm)
Part: achene
Color: black and white
Additional ethnobotanical information: a domesticated taxon
Alterations: none
Where grows today: a New World domesticate that is likely grown throughout the area, in both uplands and lowlands, especially preferring roadsides and fields

SCIENTIFIC NAME: *Juniperus/Cupressus*
Common name(s): juniper, cypress, *táscate* (Sp), ***aorí*** (Rm), ***aborí*** (Rm), ***awarí*** (Rm), ***péchuri*** (Rm)
Part: wood
Color: dark brown (dyed)
Additional ethnobotanical information: leaves used as a tea or wash for colds, toothaches, stomach problems, incense, muscle relaxant
Alterations: carved, dyed
Where grows today: two native genera that grow in the uplands.

SCIENTIFIC NAME: *Martynia annuua* L.
Common name(s): devil's claw, ***chorĺkari*** (Rm)
Part: fruit
Color: black
Additional ethnobotanical information: Warihio eat the seeds, which are high in oil content, whole or ground (Gentry 1963:92). Rarámuri eat the seeds and young leaves
Alterations: short, naturally sharp claw points have been filed down just a bit to smooth them
Where grows today: a native plant that grows well in the tropical lowlands, up to 1000 m. It is common in fields and other disturbed areas around Alamos, Sonora.

SCIENTIFIC NAME: *Otatea* type
Common name(s): bamboo
Part: stem
Color: tan
Alterations: cut into short segments
Where grows today: a native plant that likes moist canyons and hillsides, up to 1000 m. This identification remains to be confirmed on the basis of anatomical evidence. Other grasses (e.g. *Arundo, Phragmites, Arundinaria, Lasiacis,* and *Muhlenbergia*) may also provide robust stems for bead-making.

SCIENTIFIC NAME: *Pinus leiophylla* var. *chihuahuana* type
Common name(s): chihuahua pine, ***oko-kó*** (Rm)
Part: bark
Color: brown
Note: Also in the region, *Pinus ponderosa* Lawson var. *arizonica* (Engelm.) Shaw has thick, platey bark that could be carved into pendants
Additional ethnobotanical information: leaves made into a tea for headaches
Alterations: carved
Where grows today: one of the many native pines of the upland coniferous forest.

SCIENTIFIC NAME: *Pisum sativum* L.
Common name(s): garden pea
Part: seed
Color: white
Alterations: none
Where grows today: a domesticated plant introduced from the Old World; grown in gardens (Bailey 1974:553).

SCIENTIFIC NAME: *Pithecellobium dulce* (Roxb.) Benth.
Common name(s): ***guamúchili*** (Rm), ***guamútcali*** (Rm)
Part: seed
Color: black
Additional ethnobotanical information: The pulpy, acidulous aril surrounding the seeds is a favorite spring food of Mexicans and Warihio (Gentry 1963:94). Leaves made into a tea for gastrointestinal ailments
Alterations: none
Where grows today: a native tree of thorn forest or tropical deciduous forest, sometimes in dry pine-oak forest, from sea level to 1600 m, now widely planted and naturalized along roads and in other disturbed habitats (McVaugh 1987:234). Often incorrectly thought to be an introduced taxon, since it was carried by the Spanish in colonial times to the Philippines, from where it went to India, where it was first described and named botanically (McVaugh 1987:234).

SCIENTIFIC NAME: *Quercus* spp. (at least two species used)
Common name(s): oak, ***rojí*** (Rm)
Part: acorn, missing the cap
Color: brown, black (dyed)
Additional ethnobotanical information: Bark is crushed and made into an ointment for inflammations and pains. The leaves are made into a tea for gastrointestinal ailments. The juice of the acorns is good for heart problems and an aid during pregnancy.
Alterations: black ones appear dyed, possibly in a bath of burned lard
Where grows today: many native oaks grow in the uplands; no attempt was made to identify the acorns by species.

SCIENTIFIC NAME: *Ricinis communis* L.
Common name(s): castor bean, ***uraké*** (Rm)
Part: seed
Color: mottled; basic color varied, from white to dark brown
Additional ethnobotanical information: Seeds eaten raw for gastrointestinal ailments, and the seeds and leaves together are made into a poultice to treat bruises, swellings, inflammations, and boils. The leaves are also made into a poultice to treat headaches, or used as an ointment for sores and cankers.
Alterations: none
Where grows today: introduced from tropical Africa, robust plants with huge leaves grow lushly in the uplands

SCIENTIFIC NAME: *Rhynchosia precatoria* (L.) D.C.
Common name(s): rosary bean, blackbird's eye, *chánate pusí* (Sp), ***munísowa*** (Rm)
Part: seed
Color: two tone, black and reddish-orange
Additional ethnobotanical information: Gunn (1969) suggests that a single seed of a similar tropical plant of the Old World *(Abrus precatorius)* would be deadly poisonous if ingested by a human. Sturtevant (in Hedrick 1972:17) says the seeds are edible, but among the hardest and most indigestible of all the pea tribe. However, the 1972 edition of this book provides a cautionary publisher's note on the seed's toxicity. The Latin word *precator* means "one who prays." The Mayo are reported to have used the seeds in necklaces (Gentry 1963:100). The Rarámuri used the seed crushed and made into an ointment or poultice to treat back pain and rheumatism.
Alterations: none
Where grows today: *Rhynchosia* is a native liana that grows in shady canyon bottom settings, up to 600 m in elevation, often on north-facing slopes in the tropical deciduous forest (data from ARIZ herbarium sheets).

SCIENTIFIC NAME: *Yucca* sp.
Common name(s): broad-leaved yucca, ***sokó*** (Rm)
Part: seed, thick like a dime
Color: black
Alterations: none
Where grows today: a native plant that can grow between 900 to 2425 m, with pinyon and juniper trees (Kearney and Peebles 1960:187).

SCIENTIFIC NAME: *Zea mays* L.
Common name(s): maize, corn, ***sukú*** (Rm)
Part: caryopsis
Color: deep purple/black
Additional ethnobotanical information: The tassels of maize are used by the Rarámuri as a tea to treat kidney and bladder infections. They consider themselves descendant from corn.
Alterations: none
Where grows today: a New World domesticate that grows all throughout the uplands and lowlands.

SCIENTIFIC NAME: Unknown dicotyledon; diffuse porous
Common name(s): unknown
Part: wood
Color: white
Alterations: carved into beads and crosses
Notes: In 1963, Pennington (1963:214-215) suggested that *Ptelea trifoliata,* the hop tree, supplied an easily worked wood that has been fashioned into crosses or beads. Anatomical comparisons between the 1994 materials and *Ptelea* must still be done.

Appendix 2.—Specific details on individual Rarámuri necklaces purchased in 1994

NECKLACE #1.
Bead Types: 1:1, *Zea mays* caryopsis: unknown dicotyledon stem
Pendant: Rarámuri Cross, unknown dicotyledon wood (fibrous, diffuse porous)
Strung on: undyed synthetic (nylon or polyester) thread.

NECKLACE #2.
Bead Types: 4:1, *Ceiba acuminata* seed: *Otatea* type stem
Pendant: Rarámuri Cross, unknown dicotyledon wood (fibrous, diffuse porous)
Strung on: red-dyed synthetic (nylon or polyester) thread.

NECKLACE #3.
Bead Types: 5:1, *Ceiba acuminata* seed: *Erythrina flabelliformis* seed
Pendant: miniature drum with 2:1, *Ricinis communis* seeds: *Erythrina flabelliformis* seeds
Strung on: light pink cotton thread.

NECKLACE #4.
Bead types: 11:1, *Ceiba acuminata* seed: *Erythrina flabelliformis* seed
Pendant: none
Strung on: light pink synthetic (nylon or polyester) thread.

NECKLACE #5.
Bead types: 1:1, *Quercus* sp. acorn (lacking cap and dyed black): *Erythrina flabelliformis* seed
Pendant: carved *Pinus leiophylla* type bark figure, Father Sun
Strung on: multi-colored synthetic (nylon or polyester) string; may be cotton wrapped.

NECKLACE #6.
Bead types: 7:1, *Coix lacryma-jobi* caryopses: *Erythrina flabelliformis* seeds
Pendant: none
Strung on: light blue heavy single strand fishing line.

NECKLACE #7.
Bead types: 1:1, *Coix lacryma-jobi* caryopses: *Erythrina flabelliformis* seeds
Pendant: none
Strung on: yellow, flat synthetic (plastic) strands (two, parallel and untwisted), as the strands of which commercial fruit (e.g., grapefruit) bags are made.

NECKLACE #8.
Bead types: 1:1, *Ricinis communis* seeds: *Erythrina flabelliformis* seeds
Pendant: carved *Pinus leiophylla* type bark Virgin de Guadalupe face, with nine carved and dyed *Juniperus/Cupressus* wooden angular beads, and 1:1, *Ceiba acuminata* seeds: *Erythrina flabelliformis* seeds. Pendant held together with copper wire.
Strung on: yellow synthetic thread, melted to seal ends.

NECKLACE #9.
Bead types: 3:1, *Ricinis communis* seeds: *Otatea* type stem
Pendant: none
Strung on: pink synthetic (nylon or polyester) thread, possibly cotton wrapped.

NECKLACE #10.
Bead types: solely immature *Arbutus* spp. fruit
Pendant: Rarámuri cross, unknown dicotyledon wood (fibrous, diffuse-porous)
Strung on: undyed cotton thread; 4 strands.

NECKLACE #11.
Bead types: 1:1:, *Helianthus annuus* achenes: mature *Arbutus* spp. fruit
Pendant: none
Strung on: bright green synthetic (nylon or polyester) thread.

NECKLACE #12.
Bead types: 15:3, *Albizzia sinaloens*is seed: *Yucca* sp. seed
Pendant: none
Strung on: yellow, heavy single strand synthetic fishing line, doubled for strength.

NECKLACE #13.
Bead types: 1:1, *Martynia annuua* fruit: *Erythrina flabelliformis* seeds
Pendant: none
Strung on: bright red synthetic (nylon or polyester) thread.

NECKLACE #14.
Bead types: solely *Quercus* sp. acorns, lacking the caps
Pendant: none
Strung on: rose-colored synthetic (nylon or polyester) thread, 3 strands.

NECKLACE #15.
Bead types: solely *Rhynchosia precatoria* seeds
Pendant: none
Strung on: yellow, heavy, 1-strand synthetic fishing line.

NECKLACE #16. Baca Institute of Ethnobotany (BIE) # NA-SW-TA-N-19
Bead types: 3:3, *Ricinis communis* seeds: *Pithecellobium dulce* seeds
Pendant: none
Strung on: pink cotton thread.

NECKLACE #17. BIE # NA-SW-TA-N-17
Bead types: 1:1, mature *Arbutus* fruit: white *Pisum sativum* seeds
Pendant: none
Strung on: white cotton thread.

NECKLACE #18. BIE # NA-SW-TA-N-16
Bead types: 5:4, *Ceiba acuminata* seeds: *Albizzia sinaloensis* seeds (green, flat)
Pendant: none
Strung on: grey synthetic (nylon or polyester) thread.

NECKLACE #19. BIE # NA-SW-TA-N-18
Bead types: 10:1, *Acacia farnesiana* seeds strung lengthwise: *Acacia farnesiana* seeds strung widthwise. This necklace is clearly a rosary.
Pendant: Rarámuri cross, unknown dicotyledon wood (fibrous, diffuse-porous)
Strung on: yellow fishing line.

NECKLACE #20. BIE # NA-SW-TA-N-2
Bead types: 12:2:1, *Ceiba acuminata* seeds: *Coix lacryma-jobi* caryopses: *Erythrina flabelliformis* seeds
Pendant: drum, made of goat skin, red cotton thread, *Otatea* with 2:1, *Erythrina flabelliformis* seed: *Otatea* stem
Strung on: red cotton thread.

NECKLACE #21. BIE # NA-SW-TA-N-3
Bead types: 1:1, red and tan *Erythrina flabelliformis* seeds: carved and black dyed unknown wood
Pendant: carved *Pinus leiophylla* type bark Virgin figure.
Strung on: yellow monofilament.

NECKLACE #22. BIE # NA-SW-TA-N-4
Bead types: solely *Quercus* acorn (lacking cap)
Pendant: Rarámuri cross, carved of *Juniperus* wood.
Strung on: white cotton string.

NECKLACE #23. BIE # NA-SW-TA-N-5
Bead types: solely *Coix lacryma-jobi* caryopses and one carved bead of unknown dicotyledon wood
Pendant: Rarámuri cross, carved of unknown dicotyledon wood.
Strung on: purple synthetic thread.

NECKLACE #24. BIE # NA-SW-TA-N-8
Bead types: 5:1, *Erythrina flabelliformis* seeds: tan *Erythrina flabelliformis* seeds
Pendant: Rarámuri cross, carved *Pinus leiophylla* type bark
Strung on: white cotton thread.

NECKLACE #25. BIE # NA-SW-TA-N-9
Bead types: solely *Quercus* acorn (lacking cap)
Pendant: Tarahumara four directions symbol, carved of *Pinus* wood.
Strung on: white synthetic thread.

NECKLACE #26. BIE # NA-SW-TA-N-11
Bead types: 3:2:1:, Yucca seeds: *Ceiba acuminata* seed: *Erythrina flabelliformis* seeds
Pendant: none
Strung on: yellow nylon thread.

NECKLACE #27. BIE # NA-SW-TA-N-12
Bead types: solely mature *Arbutus* sp. fruit
Pendant: none
Strung on: white nylon thread.

NECKLACE #28. BIE # NA-SW-TA-N-13
Bead types: 8:1, *Ceiba acuminata* seeds: tan *Erythrina flabelliformis* seeds
Pendant: 15 x 8.5 cm crucifix with carved Jesus figure. Both are carved from *Pinus* wood.
Strung on: red nylon thread.

NECKLACE #29. BIE # NA-SW-TA-N-14
Bead types: 23:1, *Albizzia sinaloensis* seed: red *Erythrina flabelliformis* seeds
Pendant: none
Strung on: orange nylon thread.

NECKLACE #30. BIE # NA-SW-TA-N-15
Bead types: 10:1:1:1, *Albizzia sinaloensis* seeds: *Coix lacryma-jobi* caryopsis: *Erythrina flabelliformis* seed: *Coix lacryma-jobi* caryopsis
Pendant: drum, plus three danglers of 1:3:1, *Erythrina flabelliformis* seed: *Coix lacryma-jobi* caryopses: *Erythrina flabelliformis* seed.
Strung on: yellow nylon thread.

NECKLACE #31. BIE # NA-SW-TA-N-2
Bead types: 8:1:1:1, *Ceiba acuminata* seeds: *Coix lacryma-jobi* caryopsis: *Erythrina flabelliformis* seed: *Coix lacryma-jobi* caryopsis
Pendant: drum, plus two danglers of 1:1:1, *Erythrina flabelliformis* seed: *Otatea* type stem: *Erythrina flabelliformis* seed.
Strung on: red cotton thread
Pendant: drum, made of goat skin, red cotton thread, *Otatea* with 2:1, *Erythrina flabelliformis* seed: *Otatea* stem
Strung on: red cotton thread.

NECKLACE #32. BIE # NA-SW-TA-N-1
Bead types: 1:1: *Ricinis communis* seed: *Erythrina flabelliformis* seed.
Pendant: none
Strung on: red cotton thread.